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(71) Applicant (for all designated States except US): JALUNA  
SA [FR/FR]; 6, avenue Gustave Eiffel, F-78180 Mon-  
tigny-le-Bretonneux (FR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): LESCOUET, Eric

[FR/FR]; 28, avenue Ledru-Rollin, F-75012 Paris (FR).  
**GROUZDEV, Vladimir** [RU/FR]; 6, rue Alexandre  
Bertrand, F-78100 Saint Germain-en-Laye (FR).

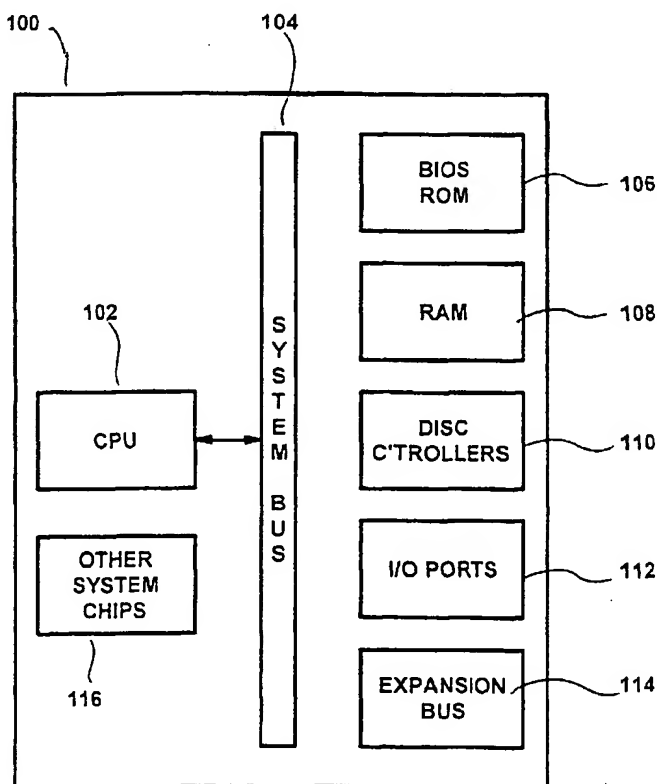
(74) Agents: **MUSKER, David, Charles et al.**; R.G.C. Jenkins  
& Co., 26 Caxton Street, London SW1H 0RJ (GB).

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(54) Title: OPERATING SYSTEMS



(57) Abstract: A method of enabling multiple different operating systems to run concurrently on the same computer, comprising selecting a first operating system to have a relatively high priority (the realtime operating system, such as C5); selecting at least one secondary operating system to have a relatively lower priority (the general purpose operating system, such as Linux); providing a common program (a hardware resource dispatcher similar to a nanokernel) arranged to switch between said operating systems under predetermined conditions; and providing modifications to said first and second operating systems to allow them to be controlled by said common program.

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Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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# INTERNATIONAL SEARCH REPORT

International Application No  
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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06F9/46

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 162 536 A (HITACHI LTD) 12 December 2001 (2001-12-12)  paragraph '0011! - paragraph '0028! -----	1-7, 10-12, 20, 21, 25, 26, 28, 29
X	EP 1 054 322 A (HITACHI, LTD) 22 November 2000 (2000-11-22) paragraphs '0043! - '0045!, '0065! - '0070! -----	1, 13, 14
X	US 2001/016879 A1 (ARAI TOSHIAKI ET AL) 23 August 2001 (2001-08-23)  paragraph '0016! - paragraph '0019! paragraph '0054! - paragraph '0063! ----- -/--	1-7, 10, 20, 21, 25, 26, 28, 29

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

\*A\* document defining the general state of the art which is not considered to be of particular relevance

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\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the International filing date but later than the priority date claimed

\*T\* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*Z\* document member of the same patent family

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Bijn, K

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/003731

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/036843 A1 (NAKAMURA KOZO ET AL) 20 February 2003 (2003-02-20)  paragraph '0036! - paragraph '0056! -----	1-5,10, 20,21, 25,26, 28,29
A	"Jaluna-2 Preview Release 1 Description" JALUNA PRODUCT DOCUMENTATION, December 2002 (2002-12), pages 1-32, XP0001189063 the whole document -----	1-32

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2004/003731

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:  
1-14 20 21 25 26 28 29 32-36
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12 20 21 25 26 28 29 32-36

Handling processor exceptions for the second operating system in virtual fashion  
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2. claims: 13-14

Providing access to shared input and/or output devices  
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3. claims: 15-18

Restarting the second operating system without interrupting operation of the first operating system  
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4. claim: 19

Debugging the operating systems  
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5. claims: 22-24 27

Providing inter-operating system communication  
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6. claim: 30 31

Modifying each operating system for operating in multiple operating system mode  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/003731

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1162536	A	12-12-2001	EP 1162536 A1	12-12-2001
EP 1054322	A	22-11-2000	JP 2000330806 A	30-11-2000
			EP 1054322 A2	22-11-2000
			US 6615303 B1	02-09-2003
US 2001016879	A1	23-08-2001	JP 3546678 B2	28-07-2004
			JP 11149385 A	02-06-1999
			JP 2001216172 A	10-08-2001
			JP 2004038995 A	05-02-2004
			US 6772419 B1	03-08-2004
			US 2001025371 A1	27-09-2001
			US 2004237086 A1	25-11-2004
US 2003036843	A1	20-02-2003	JP 2003036174 A	07-02-2003